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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/612,798	07/02/2003	Gesine Arends	2493 A	5336

7590 12/19/2007
STRIKER, STRIKER & STENBY
103 East Neck Road
Huntington, NY 11743

EXAMINER

LEUNG, JENNIFER A

ART UNIT	PAPER NUMBER
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1797

MAIL DATE	DELIVERY MODE
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12/19/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/612,798

Applicant(s)

ARENDT ET AL.

Examiner

Jennifer A. Leung

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 October 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Jennifer A. Leung
December 15, 2007

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on October 3, 2007 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 5 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

It is unclear as to the limitation applicant is attempting to recite by "an inlet opening (12) and/or an outlet opening (11) of the first and/or second heating element (6,8) is provided with the flap for apportioning the heating stream (6)", because the outlet opening of the second heating element has already been provided with the flap (see claim 1, lines 18-19). It is unclear as to whether Applicant is attempting to recite the provision of additional flaps to the apparatus.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura (JP 62-74448).

Regarding claim 10, Kitamura (FIGs. 1-4; Abstract) discloses a fuel cell assembly comprising a fuel cell unit (i.e., at a point downstream from element 21; see Abstract) and an apparatus for converting a hydrocarbon containing flow of matter to a hydrogen-enriched fluid flow, wherein the apparatus comprises:

a heating apparatus (i.e., burner 4) for production of a heating stream, wherein the heating stream is separated into two flue gas partial flows (i.e., at conduit 12, the heating stream is divided between conduit 25 and the innermost layer of heat exchanger 24);

a first converter (i.e., the middle layer of heat exchanger 24, in communication with conduit 13) and a second converter (i.e., the reformer pipe 9) arranged behind the first converter in a flow direction of matter (i.e., as defined by the supply of reactants via conduits 17, 18 to the discharge of generated hydrogen gas via conduit 16);

a first heating element flowed-through by the heating stream (i.e., the heating chamber 8 defined by shell 1) for heating the second converter 9, wherein in at least one operating phase,

the heating stream 8 for the second converter 9 flows completely counterflow to the flow of educt matter (i.e., the heating stream flows downward in chamber 8 whereas the matter may flow upwards in reformer tube 9; see FIG. 1, 2);

a second heating element (i.e., the innermost layer of heat exchanger 24, in communication with conduit 12) flowed-through by the heating stream for heating the first converter (i.e., for heating the middle layer of exchanger 24); and

an outlet opening (i.e., to conduit 26) provided on the second heating element, wherein the second heating element is provided with a control valve 28 for closing the outlet opening.

Kitamura, however, is silent as to the control valve 28 comprising a “flap” valve. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to select/substitute a “flap” valve for the control valve 28 in the apparatus of Kitamura, on the basis of suitability for the intended use, because the Examiner takes Official Notice that “flap” valves are well known in the art as flow regulating structures, and the substitution of known equivalent structures involves only ordinary skill in the art. *In re Fout* 213 USPQ 532 (CCPA 1982); *In re Susi* 169 USPQ 423 (CCPA 1971); *In re Siebentritt* 152 USPQ 618 (CCPA 1967); *In re Ruff* 118 USPQ 343 (CCPA 1958).

Regarding claim 11, the same comments with respect to Kitamura, from claim 10 above, apply. Kitamura, however, does not disclose a motor vehicle in the Abstract or the figures. In any event, it would have been obvious for one of ordinary skill in the art at the time the invention was made to use the fuel cell assembly of Kitamura in a motor vehicle, because the Examiner takes Official Notice that the use of fuel cells for powering motor vehicles would have been considered well known in the art.

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4. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno et al. (JP 02-120205) in view of Yoshioka et al. (JP 63-049249) and Tanizaki et al. (JP 06-227801).

Regarding claim 1, Mizuno et al. (see FIGs. 5(A) and 5(B); English Abstract) discloses an apparatus comprising:

a heating apparatus (i.e., burner 2) for production of a heating stream wherein the heating stream is separated into two flue gas partial flows (i.e., one flow into the heating bed 5a, another flow into the heating bed 5b); and

a first converter (i.e., catalyst tank 3a, containing a reforming catalyst 4a) and a second converter (i.e., catalyst tank 3b, containing a reforming catalyst 4b) arranged behind the first converter in the flow direction of a hydrogen enriched fluid flow, wherein each of the converters (3a, 3b) is configured for reforming hydrocarbons to hydrogen, wherein the flow of matter containing hydrocarbons (i.e., supplied via inlet 6) is converted in the first converter (3a) and the second converter (3b) to a hydrogen enriched fluid flow (i.e., exiting via outlet 10).

According to a FIRST interpretation of the prior art, Mizuno et al. discloses a first heating element (i.e., heating bed 5b) flowed-through by the heating stream for heating at least one of the first and second converters (3a, 3b), wherein, in at least one operating phase, the heating stream in the heating bed (5b) flows completely in a counterflow direction to the flow of matter in the second converter (3b), (see FIG. 5(A)); a second heating element (i.e., heating bed 5a with heating bed 5c) that is flowed through by the heating stream for heating at least one of the first and second converters (3a,3b); and an outlet opening (12) provided on the second heating element.

According to a SECOND interpretation of the prior art, Mizuno et al. discloses a first

heating element (i.e., heating bed 5a with heating bed 5c) flowed-through by the heating stream for heating at least one of the first and second converters (3a,3b), wherein, in at least one operating phase, the heating stream in heating bed (5a) flows completely in a counterflow direction to the flow of matter in the second converter (3b); a second heating element (i.e., heating bed 5b) that is flowed through by the heating stream for heating at least one of the first and second converters (3a,3b); and an outlet opening (i.e., at 13) provided on the second heating element (5b).

The apparatus of Mizuno et al. is the same as the instantly claimed apparatus, except that Mizuno et al. is silent as to the provision of a flap for closing the outlet opening (12 or 13).

Yoshioka et al. (FIGs. 1, 2; Abstract) teaches an apparatus for converting a flow of matter containing hydrocarbons to a hydrogen-enriched fluid flow, wherein the apparatus comprises a heating apparatus (i.e., burner 7) for production of a heating stream; a converter (10,10a) for reforming hydrocarbons to hydrogen; and heating elements (i.e., heating chambers 8a, 8b) flowed through by the heating stream for heating the converter. In particular, Yoshioka et al. teaches that an outlet opening (15, 27) of the heating element (8a, 8b) is provided with a valve (26, 29) for closing the outlet opening. Tanizaki et al. (FIG. 2; Abstract; Machine Translation) also teaches an apparatus for converting a flow of matter containing hydrocarbons to a hydrogen-enriched fluid flow, wherein a valve in the form of a flap (13) is provided to regulate the quantity of heat supplied by a heating stream (from inlet 11) to the converter (i.e., reforming part 9).

It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide a flap for closing the outlet opening (12, 13) in the apparatus of Mizuno et al., because the flap would have allowed for the temperature of the converters to be regulated, by

controlling the amount of heat applied by the heating stream to the converters at a given location within the apparatus, as suggested by Yoshioka et al. and Tanizaki et al.

Regarding claim 2, Mizuno et al., as best understood, discloses that the heating stream for the first and second converters (3a,3b) flows completely in a counterflow direction to the flow of matter (i.e., the heating stream in heating bed 5a or 5b is counterflow to the flow of matter in the second converter 3b; also, the heating stream in heating bed 5c is counterflow to the flow of matter in the first converter 3a; see FIG. 5(A)).

Regarding claim 3, according to the FIRST interpretation of the prior art, the modified apparatus of Mizuno et al. structurally meets the claims, because the second heating element (5a,5c) is flowed through by the heating stream for heating one of the first and second converters (3a,3b). According to the SECOND interpretation of the prior art, the modified apparatus of Mizuno et al. structurally meets the claims, because the second heating element (5b) is flowed through by the heating stream for heating one of the first and second converters (3a,3b). Please note that the recitation of a desired operating period for the heating element (i.e., during a start phase) adds no further patentable weight to the claim, since a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the structural limitations of the claim.

Regarding claim 4, according to the SECOND interpretation of the prior art, Mizuno et al. discloses that the second heating element (5b) is disposed between the first and second converters (3a,3b). (see FIGs. 5(A) and 5(B)).

Regarding claim 5, as modified above, the outlet opening (12) of the second heating

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element (5a,5c) is provided with the flap, according to the FIRST interpretation of the prior art. And, as modified above, the outlet opening (13) of the second heating element (5b) is provided with the flap, according to the SECOND interpretation of the prior art.

Regarding claim 6, Yoshioka et al. (see FIGs. 1, 2; Abstract) further teaches that a control unit (i.e., including elements 32, 33, 34, 35, 36) is provided for controlling the opening and closing of the valve (26, 29). It would have been obvious for one of ordinary skill in the art at the time the invention was made to provide the control unit as taught by Yoshioka et al. in the modified apparatus of Mizuno et al., because the control unit would have allowed for an optimal temperature of the converters to be automatically maintained, by controlling the supply of heat to the converters via automatic opening and closing of the flap/valve.

Regarding claim 7, Mizuno et al. discloses that the converters (3a,3b) and heating elements (5a,5b,5c) are arranged approximately coaxially to one another (see FIG. 5(B)).

Regarding claim 8, Mizuno et al. discloses that the heating apparatus (2) is arranged approximately coaxial to the converters (3a,3b) and heating elements (5a,5b,5c). (see FIG. 5(A)).

Regarding claim 9, the heating apparatus (2) of Mizuno et al. is located below the converters (3a,3b) and heating elements (5a,5b,5c). (see FIGs. 5(A), 5(B)). Mizuno et al. is silent as to whether the heating apparatus (2) may be located approximately centrally to the converters and heating elements. Yoshioka et al., however, teaches a heating apparatus (7) that is located approximately centrally to the converter (10,10a) and the heating elements (8a,8b). (see FIG. 2). It would have been an obvious design choice for one of ordinary skill in the art at the time the invention was made to shift the locating of the heating apparatus (2) in the modified apparatus of Mizuno et al. to a location that was approximately central to the converters and the

heating elements, because the approximately central location would have predictably provided another satisfactory configuration for providing a heating stream for heating the converters, as evidenced by Yoshioka et al., and furthermore, the shifting location of parts was held to be obvious. *In re Japikse*, 181 F.2d 1019, 1023, 86 USPQ 70, 73 (CCPA 1950).

5. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizuno et al. (JP 02-120205) in view of Yoshioka et al. (JP 63-049249), Tanizaki et al. (JP 06-227801) and Szydlowski et al. (EP 0 275 549).

The same comments with respect to Mizuno et al., Yoshioka et al. and Tanizaki et al. from claim 1 above apply. Mizuno et al., however, is silent as to the apparatus being used in combination with a fuel cell unit, as a fuel cell assembly in a motor vehicle. However, it would have been obvious for one of ordinary skill in the art at the time the invention was made to use the modified apparatus of Mizuno et al. in combination with a fuel cell unit, as a fuel cell assembly in a motor vehicle, because such application of the hydrogen producing apparatus would have been considered well known to one of ordinary skill in the art, as further supported by Szydlowski et al. (see column 1, lines 10-31). Furthermore, when a patent simply arranges old elements with each performing the same function it had been known to perform and yields no more than one would expect from such an arrangement, the combination is obvious. *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385 (2007).

Response to Arguments

6. Applicant's arguments in combination with the amendments filed on October 3, 2007, with respect to the rejection of claims 1-9 under 35 U.S.C. 103(a) as being unpatentable over Kitamura (JP 62-74448), have been fully considered and are persuasive. Therefore, the rejection

has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of the newly applied prior art.

7. Applicant's arguments with respect to the rejection of claims 10 and 11, have been fully considered but they are not persuasive. Beginning on page 7 (third paragraph), Applicant argues,

“In the final Office Action, claims 1-11 were rejected under 35 U.S.C. 103(a) as being unpatentable over JP 62-74448 to Kitamura. The Advisory Action dated August 21, 2007, issued in response to the Applicants' Request for Reconsideration, maintained the final rejection.

In the Advisory Action, the Examiner noted that the features upon which the Applicants relied (i.e., the first converter and the second converter each being configured for reforming hydrocarbons to hydrogen) are not recited in claim 1. In the present amendment, therefore, claim 1 has been amended to define the present invention more clearly over the cited reference to Kitamura by defining that "each of the first converter and the second converter is configured for reforming hydrocarbons to hydrogen" and that "the flow of matter containing hydrocarbons is converted in the first converter and in the second converter to a hydrogen-enriched fluid flow".

Although Applicant's amendment to claim 1 overcomes the rejection of claim 1-9 under 35 U.S.C. 103(a) as being unpatentable over JP 62-74448 to Kitamura, it is noted that the argued limitations have not been included in independent claims 10 and 11.

As stated in the advisory action of August 21, 2007, the claims set forth that the “apparatus”, via its collective elements (i.e., including a heating apparatus, a first converter, a second converter, a first heating element, a second heating element and an outlet opening with a flap), is what converts the flow of matter containing hydrocarbons to a hydrogen-enriched flow.

The features upon which Applicant relies (i.e., the first converter and the second converter each being configured for reforming hydrocarbons to hydrogen) are not recited in

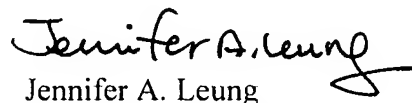
rejected claims 10 or 11. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer A. Leung whose telephone number is (571) 272-1449. The examiner can normally be reached on 9:30 am - 5:30 pm Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn A. Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


Jennifer A. Leung
December 15, 2007